

# SURFACE RESONANCE

## Phase 1

### Table overview

Time/Work	Findings, focus, key directions	Findings against principal research aims			
		Abstraction of 'riddim'	Low frequency sound activating spaces	Tactile system as an instrument	The dialogue between hearing and sensation

**Max/MSP, trying to dissect and reproduce vibration sounds**

*Understanding the physics of surface resonance*

Consulting with acousticians  
 Programming building blocks to emulate vibration  
 Trying different synthesis approaches  
 Massive time and technical challenge

**Field recordings - vibrations from nightclubs**

*Discover that field recordings give a too explicit, musical reference*

*Realising the sonic complexity of resonant surfaces, too difficult to model*

*Begin to understand the complexity in recording vibration*

Recordings intended to be used in composition  
 Aiming to understand and highlight the nature of musical vibration

**Field recordings, atmospheric low frequency sound**

*Furthering my understanding of the sound/vibration relationship and characteristics*

Finding locations where low frequency sound was a dominant characteristic  
 Trying to express the natural potential of vibration to occur, given the right intensity of stimulus

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**Exciting vibration in a space, large PA**

*To create the effect of musical vibration without the direct and obvious sound of a musical source*

*Considering how reliant the low frequency sound effect is on having a large system - does not translate on recording*

Use of effects to blur sense of riddim

Effects to emulate the natural abstraction of LF sound in a space

Focus and understanding of the bass stimulus and vibration 'tailing' response

Testing with powerful soundsystem to achieve vibration in a controlled environment

Set up materials to vibrate

**Processing recordings to disassociate the bassline + environment**

*What can I create without reliance on a big soundsystem?*

*Stepping further away from riddim*

Effects to smudge the tonal and timing emphasis of the riddim

Shifting sequences to further break the sense of musical pattern

**Adding atmospheric low frequency material**

Merging in ambiances, further shifting the source material

Concludes with work drawing on musical and environmental vibration. Research findings:

- I need to create sense of the vibration in spaces without reliance on big PA setups
- I gained a better understanding of how vibration sounds, is created and relates to low frequency stimulus, and how to record
- Using music-based recordings, I employed many techniques to blur riddim but the musical link/pattern remains
- Use of more ambient material developed the creative process and helped explore the idea that vibration potential is inherent within materials, subject to LF stimulus

# SURFACE RESONANCE

## Phase 2

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**Simulating vibration from composed material, using bass amp and the vibration table**

*Shift from using vibration in recordings to generating material in the studio*

*Expand available sounds and options – a more 'live' sound*

Working with smaller material, glass, bolts etc

Develop my thinking on the way I can produce and control vibration sounds

**First experiments with the table as a sounding device – larger scale vibrating material**

*Develop idea of the table as an instrument*

*Understand behaviour of audio through the table*

*Expression through playing the table*

Using a basic three tone riddim, aiming for a simplified, not expressly musical sense of rhythmic pattern

Using hand and foot pressure to dampen, observing how different approaches change the character of sound of vibrating MDF

Gain a better understanding of how I can record large surfaces, microphone placement

Drive to use more materials, to offer better range of sounds with expressive range

First thoughts of the table as an instrument

Exploring the sound of the vibration table itself: how tone (increased harmonics) changes with volume, best frequency range, and using distortion to emulate vibration noise / harmonics

Basic synthesised tones

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<p><b>First time generating material intended for the table</b></p>	<p><i>Departure from riddim. Wanting smoothness of vibration and organic source, with richer harmonic content</i></p>	<p>Use of bass guitar drones</p> <p>Vibration transducer feedback loop to colour and articulate the sound into modulation</p>		<p>Deep drone + harmonics significant to bodily sensation</p> <p>Feedback with shifting, organic source offered more playability and expression</p>	
<p><b>Presentation to the postgraduate group</b></p>	<p><i>Solidify intent to have sensation/ installation focus</i></p> <p><i>Concept – method of improvisation</i></p>	<p>Recognising unpredictability in previous drone/ feedback experiments</p> <p>Method of improvisation – to have central malleable content with more predictable range to articulate</p>			<p>Group interest in 'live' performance, but I wanted to capture the sensation that I had experienced in composition/ testing</p>

Research findings:

- I want to create sense of the vibration in spaces without reliance on big PA setups
- Recognise potential for playing the table and found bass guitar drones as suited to generating sensation and sound
- Focus on playability and expression around drones and modulation
- Understanding unpredictability when using the table this way and desire for structure to how I approach composition
- Playing the table refocused my aim to bring sensation into the audience experience

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## Phase 3

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**Developing drone material for the table**

*Providing a stable, controllable platform for improvisation*

*First focus on deep sensation material*

*Developing ambiances to work with the (ancillary) sounds from the sensation table*

Starting with the sensation component before sound

Highly detuned bass providing deep sensation experience

Tactile transducer feedback to articulate the sensation

Recognising the need for ambiances to support the ancillary sound from the table

**Vibration and manipulation of large scale building materials**

*Develop ideas of the table as a sounding instrument*

*Understanding behaviour of audio through the table*

*Expression through playing the table*

Drawing from the initial inspiration and recording processes – vibration of buildings

Wanting vibration of materials as an edge of augmentation of other ambient sound

New challenge of composing vibration material sound to go with vibration sensation, when both can't be experienced at once

**Developing software framework for vibro-acoustic composition**

*Enabling channelling of vibration, ambiances and recording*

*Vibration transducer feedback loop*

Improved software to make control of the objects on the table more intuitive and responsive

Microphone experiments

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<p><b>Composition gutterglass embodying research</b></p> <p><i>First thoughts/ application about how sensation can act within the narrative of a work</i></p> <p><i>Applying idea of 'method of improvisation'</i></p> <p><i>Understanding how sensation affects perception of sound</i></p> <p><i>Developing methods for composing sensation and sound elements</i></p>	<p>Applying a modulating, deep drone as a central, predictable element founding the work</p>	<p>Articulating the openness of the vibration sound by hand dampening, this gesture made against other ambiances already in place</p> <p>Within the work trying to cover a whole range of subtle to discordant sound from materials</p>	<p>A deep sensation experience, not aiming to engage critical analysis of the experience</p>	<p>Working process for building ambient and vibrated acoustic elements and sensation together</p> <p>Based on a drone that worked for the body, but when composing, leading from sound first, vibration placed around this</p> <p>Developing a narrative for the role of the vibration element within sound – to support, enhance a sound, then moving to prominence within the larger piece</p> <p>The experience of sensation 'mutes' the sensitivity to otherwise potentially harsh sound – sound experience highly altered by sensation</p>	

Research provided the building blocks for the rest of the Masters program, on how the senses interact, the sorts of sounds I could create with building materials, and the sort of vibration territory that worked most naturally.

Outcomes started to tie in most comprehensively to the four research aims.

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## Phase 4

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**Revisiting sensation from riddim**

*To better explore riddim from a sensation perspective*

*Referencing again the real world example of sensation and vibration*

Deep bassline loops, dubstep, Scorn etc.

Fudging riddim through delays, reverbs tuned for sensation

However, cannot escape the sense of musical structure

Approach and aesthetic judgements founded on the experience for the body

**Composition – “Sines 121 Hz” exploring sensation construction**

*Aiming for more improvisational, expressive approach to vibration and sound generation*

*Building layers of low frequency tones*

Trying to push the properties of glass – aiming for brighter, more brittle sound

Exploring this also through mic technique

Acknowledging limitations in the material

Issues of phase interference as vibration signal

Building subtle lower frequency components to support other tones

Emerging understanding – interaction of tones as vibration needs careful structure

Testing logic of complementary vibration and sound

Trying for counterpoint, different narrative between sensation and acoustic events

**Reflecting on fundamental limitations and boundaries to vibration experience**

*Recognising that the vibration medium is very 'coarse', and simplicity is necessary*

*Questioning – how expressive can the medium be? What can I communicate and how should I approach this?*

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**Content creation for sensation, without sonic relationships**

*Focusing on frequencies, with sensation 'sweet spots' that engage the body*

*Developing material according to stutters, modulations, drones*

*Revelation – TEXTURE integral to how vibration engages with the body, over tone, frequency or other aspects of timbre*

Methodical approach to generating tones, phase shifting effects

Challenges: body picks up on very small shifts in frequency, tone generation instructive but mechanical

Turntable pickup feedback, expressed with the body

Extreme pitch shifting to focus on engaging sensations

**Work "bass feedback July 08" – based solely on tactile experience**

*Using modulation with stutters, plosions, jolts to engage the tactile sense*

Use underpinning very low frequencies

Focus away from comfortable drones to something encouraging thought on sensation

Breaking down elements of sensation opened up my understanding and work through concerns with the limitations of the medium.

Phase 5

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**Element 1 of composition 'March table project'**  
 – building from vibration

*Structuring a longer composition around passages of engaging vibration*

*Moving away from comfort zone, avoiding easier approach of lulling drones*

Mixture of vibration effects, broken up and not following smooth drone type passage, aiming for more complex compositional arc

Using material from range of previous tests, guitar feedback, turntable feedback, plucks, stutters, sines  
 – all based on engaging texture

Aim to have sound build on vibration experience, rather than vibration enhancing the acoustic information

**Element 2 – building layers of sound**

*Tension develops – vibration becomes subordinate to sound, and vibration narrative gets lost with accompanying sound*

*Pushing my understanding of inter-sensory dialogue*

Building layers of sound, flattens the perceived timing, decays, and articulation of the vibration

Rearrange to enable sound lead

Build other passages without vibration element, or more subtle underpinning vibration

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**Element 3**  
 – expanding  
 range of materials

*Opening up frequency range, colour of sounds, mic technique*

*Aiming for harsh and subtle sounds*

*Working on intersection of many different vibrating materials recordings*

Using greater range of materials – wires, glass objects on metal

Close miking technique

Many layers of sound, aiming for greater complexity

Inharmonic clashes, try to craft around using more eq, fx

Excellent research process, but end result overlaboured and not successful artistically. Pushed from my comfort zone in how to structure work, tested boundaries in how the senses interacted, approached the compositional narrative in a new way, and learnt much about selecting, miking and arranging materials.

Most useful were understanding limitations which guided later work, on limiting the complexity of sounds given their (in)harmonic makeup, on not needing to reach full discordant vibration from materials, on the advantages in drones, modulations, on not becoming lost in tweaking recordings. Also significant gains in my understanding of microphone technique and eq'ing.

Phase 6

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**Active processing of detuned bass while in feedback**

*Developing further 'played' techniques for blurring modulation and drones*

Real-time application of eq, pitch shifting, delays in the approach to bass guitar feedback generation

Microphone feedback on the table to best play at the fringe of feedback

Experiments with earth hum

**Collaboration: progressing ideas, move to undulation - tonal shifts, but organically smoothed and blurred**

*Strongest point in alluding to riddim without trappings of explicit musical reference*

*Expanding blurring approach to semi-rhythmical material, finding undulation and best expression*

Engaging bass feedback around synthesised tones

More subtle sequenced step in tone pattern gave a nice sense of tonal shift without having a direct rhythmical reference

Feedback on this offered a sense of undulation, providing a building block for composition

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**Composition aims for containment of vibration sound** *Finding a suitable frame for expressing vibration sounds – referencing initial inspirations about all material having 'potential' for vibration energy to be expressed*

Found that I am comfortable not working with full range, harsh sounds  
 Aim for sense of containment in the vibration, using hand dampening  
 Expand range of materials – use steel drum, new miking approach

**Pushing at fringes of sound / tactile interaction** *For vibro-acoustic structure, following from closely correlated, to against each other, to independent vibration, settling on closely matched with more subtle departures*

Structure aims to maintain a general correlation between hearing and sound, but with some more subtle moments of departure, where elements support each other but don't strongly contrast

**Group feedback, thinking about installation context** *Again suggesting ways to best frame composition and how it is presented - considering installation context 'attention span'*

Consider how more subtle elements communicate in installation, and how to best frame the experience

End point: finding a comfortable and effective frame for composition, which addresses my research questions. Provides basis for ongoing work with vibration, and future investigation of installation approaches.